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FACT SHEET

L-1683

EVALUATION OF TEXAS SHADE TREES

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Interest in the value and function of shade trees has grown in recent years. These trees perform several environmental functions and damage to them causes a monetary loss by the owner. The first formula for determining a dollar value of shade trees was presented to the National Shade Tree Conference in 1949. Since then, several revisions have made the formula more acceptable to insurance companies, courts and the Internal Revenue Service (IRS).

Replacement Value

The value of shade trees in Texas usually can be determined by the fair market value (planted and guaranteed) from tree nurseries. If a species is not available from a nursery and the tree is small, base the fair market value on that of a similar species of comparable size. Large tree companies sell and plant several species of trees up to 8 inches in diameter. The value of larger trees can be estimated using the formula. The formula usually underestimates the value of small trees.

The Formula

Four factors are considered in the formula: size, species, condition and location.

Size × $18 × species class × condition × location = value

Size

The shade tree evaluation committee of the International Society of Arboriculture determined that the size of a tree's trunk expresses shade tree size. The American Association of Nurserymen's approach in measuring tree diameter is generally followed. For trees with a diameter 4-inches or smaller, the size is determined at a height of 6 inches above the ground. For trees with a diameter of 4 to 8 inches, the height is determined 12 inches above the ground. For trees with diameters 8 inches or larger, the area is determined at diameter breast height (4.5 feet). Exceptions to these rules occur where low branches cause trunk swell, in which case an evaluator would measure the diameter just above the swollen area. For multi-trunked trees, full diameter of the largest trunk plus half the diameter of the other trunks determines the diameter for computing the cross section area which is the number used for the size factor in the formula (figure 1). The cross section area is determined by the formula $0.7854D^2$ where D equals the diameter measured. The current value of a perfect specimen shade tree, in the committee's opinion, is $18 per square inch of trunk cross section. For example, a 10-inch Class 1 tree in perfect condition and location would be worth $1,414.

$$(0.7854D^2 = 0.7854(10)^2 = 78.54 \text{ in.}^2$$
$$(\$18/\text{in.}^2) = \$1,414)$$

Species

Not all species and varieties of trees are equal. Permanence, maintenance needs, landscape quality and site adaptability influence the value of a species. Grouping tree species into value classes is subjective and may vary from one part of the state and one tree specialist to another. The following list can guide the appraiser who must also judge based on experience with the species.

Class 1 — 100 percent

Carya spp. — Hickories
Carya illinoensis — Pecan
Cornus florida — Flowering Dogwood
Diospyros texana — Texas Persimmon
Fagus grandifolia — American Beech
Ilex opaca — American Holly
Ilex vomitoria — Yaupon Holly
Juglans nigra — Black Walnut
Liquidambar stryraciflua — Sweetgum

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SIZE

To determine the diameter of a tree, measure a small tree (less than 4 inches in diameter) at 6 inches above the ground, a medium-sized tree (4 inches to 12 inches in diameter) at 12 inches above the ground and large tree (8 inches and greater) at 4½ feet above the ground. Use sound judgment on measuring odd shaped trees. In measuring multi-trunk trees, measure the diameter of the larger trunk and add half the diameter of the other trunks.

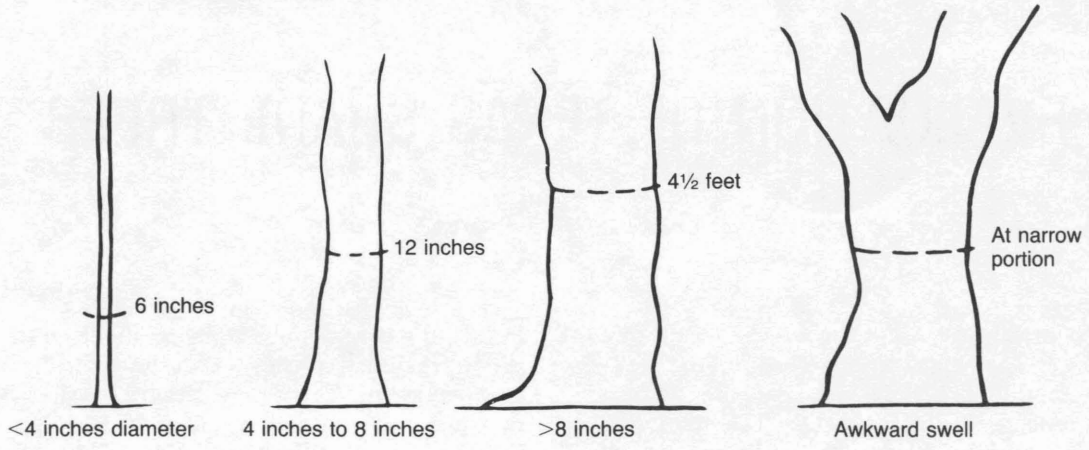


Figure 1.

Magnolia grandiflora — Southern Magnolia
Magnolia virginiana — Sweetbay
Nyssa sylvatica — Tupelo
Picea pungens — Colorado Blue Spruce
Pinus edulis — Piñon Pine
Pinus ponderosa — Ponderosa Pine
Pinus taeda — Loblolly Pine
Pithecellobium flexicaule — Texas Ebony
Quercus alba — White Oak
Quercus falcata — Southern Red Oak
Quercus macrocarpa — Bur Oak
Quercus muhlenbergii — Chinkapin Oak
Quercus nigra — Water Oak
Quercus shumardii — Shumard Oak
Quercus texana — Spanish Oak
Quercus virginiana — Live Oak
Sophora secundiflora — Mescal Bean Sophora
Taxodium distichum — Baldcypress
Ulmus crassifolia — Cedar Elm

Class 2 — 80 percent

Acer grandidentatum sinuosum — Bigtooth Maple
Arbutus texana — Texas Madrone
Ehretia anacua — Anaqua
Fraxinus velutina (Select Male) — Velvet Ash
Fraxinus velutina 'glabra' — Modesto Ash
Ginkgo biloba — Ginkgo
Gymnocladus dioicus — Kentucky Coffeetree
Koelreuteria bipinnata — Southern Golden Raintree
Koelreuteria paniculata — Panicled Golden Raintree
Lagerstroemia indica — Crepemyrtle
Liriodendron tulipifera — Tulip-poplar
Olea manzanilla — Manzanilla Olive
Pinus elliottii — Slash Pine
Pinus halepensis — Aleppo Pine
Pinus nigra — Austrian Pine
Pinus thunbergii — Japanese Black Pine
Pistacia chinensis — Chinese Pistachio
Quercus phellos — Willow Oak
Quercus stellata — Post Oak
Quercus velutina — Black Oak
Sophora japonica — Japanese Pagodatree
Ulmus americana — American Elm

Class 3 — 60 percent

Acacia farmesiana — Huisache
Acer rubrum — Red Maple
Betula nigra — River Birch
Broussonetia papyrifera — Paper Mulberry
Bumellia lanuginosa — Gum Elastic
Cedrus deodara — Deodar Cedar
Celtis occidentalis — Common Hackberry
Cercis canadensis — Redbud
Chilopsis linearis — Desert Willow
Cupressus arizonica — Arizona Cypress
Eriobotrya japonica — Loquat
Fraxinus pennsylvanica lanceolata — Green Ash
Fraxinus velutina (seedling) — Arizona Ash

Gleditsia triancanthos inermis — Thornless Honeylocust
Juniperus spp. — Junipers, Cedar
Leucaena pulverulenta — Great Lead-tree
Malus species and varieties — Flowering Crab Apples
Morus alba (fruitless) — Fruitless Mulberry
Persea americana — Avocado
Persea borbonia — Redbay
Pinus echinata — Shortleaf Pine
Pinus pinea — Italian Stone Pine
Platanus occidentalis — American Planetrees, Sycamore
Prosopis glandulosa — Honey Mesquite
Prunus mexicana — Mexican Plum
Pyrus calleryana — Callery Pear
Sabium sebiferum — Chinese Tallow
Sapindus drummondii — Western Soapberry
Ulmus parvifolia — Chinese Elm
Ulmus parvifolia sempervirens — Evergreen Elm

Class 4 — 40 percent

Acer negundo — Boxelder
Acer saccharinum — Silver Maple
Ailanthus altissima — Tree of Heaven
Albizia julibrissin — Silktree
Catalpa spp. — Catalpa
Celtis laevigata — Sugarberry
Crataegus spp. — Hawthorns
Eleagnus angustifolius — Russian Olive
Firmiana simplex — Chinese Parasol Tree
Maclura pomifera — Bois d'Arc
Melia azedarach — Chinaberry
Morus rubra — Red Mulberry
Parkinsonia aculeata — Palo Verde
Populus spp. — Cottonwood and Poplars
Prunus blireiana — Ornamental Plum
Robinia pseudoacacia — Black Locust
Salix spp. — Willows
Tamarix spp. — Tamerisk
Thuja spp. — Arborvitae
Ulmus pumila — Siberian Elm
Ziyphus jujube — Jujube

The International Shade Tree Formula recognizes five tree classes. Because many low rated species perform well in dry areas of western Texas, they do not rate as low as 20 percent, so all species here are grouped into four classes.

Condition

Few shade trees are perfect (figure 2). As trees become large and old, they often become defective through decay, broken limbs, damage by humans or uneven growth. The specialist appraising the tree must judge the condition on a percentage basis. For example, a 10-inch tree in Class 1 might be poorly proportioned or display symptoms of heart rot. Instead of being worth $1,414, it would be appraised at 60 percent or $848.40. A knowledge of tree pathology, entomology and physiology *is* important to professional evaluation. In some situations consulting a diagnostician before deciding a tree's condition percentage makes the valuation more confident. As a guide, the following system can help a trained arborist. There are six condition factors, A through F, each rate from one to five. The sum of the rating for each of the six factors is the tree's condition rating. The percent based on this rating is used in the formula.

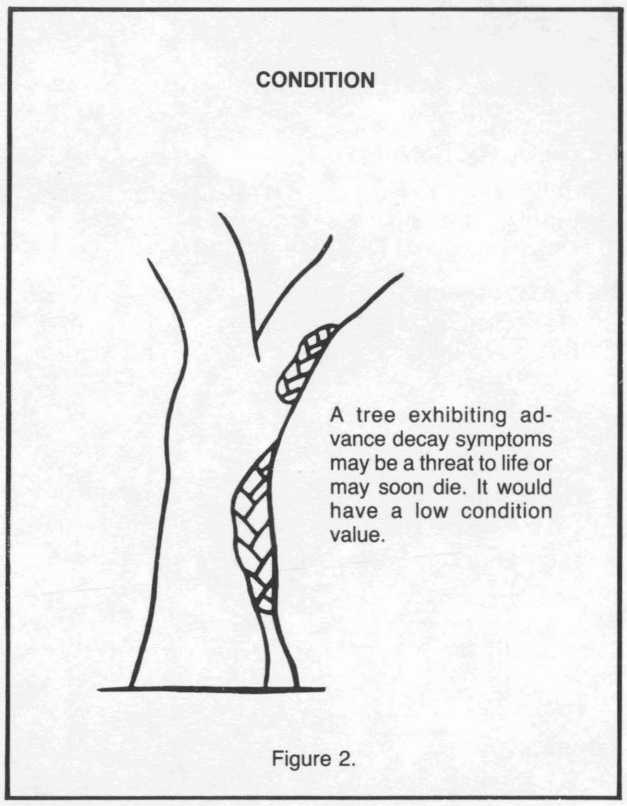


Figure 2.

A. **Trunk condition**	**Rating**
Sound and solid	5
Missing section of bark	3
Extensive decay	1
B. **Growth (varies with species)**	
Vigorous	3
Moderate	2
Poor	1
C. **Structure**	
Sound	5
One major or several minor limbs dead, broken or missing	3
Two or more major limbs dead, broken or missing	1

D. **Insect and disease**

No pests	3
One pest	2
Two or more pests	1

E. **Crown development**

Full and balanced	5
Full but unbalanced	3
Unbalanced and lacking a full crown	1

F. **Life expectancy**

More than 30 years	5
Fifteen to 20 years	3
Less than 5 years	1

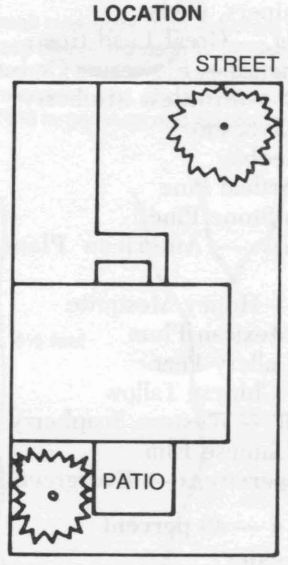
Total point rating (A+B+C+D+E+F)	Percentage to use in formula
26-23	80-100
22-19	60- 80
18-14	40- 60
13-10	20- 40
9- 6	0- 20

Location

Location determines the value of a tree in the landscape (figure 3). An understanding of the specific tree's role helps when applying this factor to the formula. The following conditions are outlined for guidance:

Feature or historical trees	90-100%
Average residential, landscape trees	80- 90%
Malls or shopping center trees	75- 85%
Public and commercial area trees	70- 80%
Arboretum and park trees	60- 80%
Golf course trees, strategically located	60- 80%
Street and boulevard trees	60- 80%
Screen and windbreak trees	60- 70%
Recreational and picnic area trees	60- 70%
Industrial area trees	50- 70%
Out-of-city highway trees	40- 60%
Native, open woods trees	30- 40%
Trees in heavily wooded areas	10- 20%

For example, if a 15-inch American elm of good form, without disease, shades a picnic area in a city park in Central Texas and is vandalized with an axe, how is the monetary damage determined assuming the tree has no chance of survival? The formula:



A patio tree has a greater location value than a tree that is out of harmony with the landscape or that may be a traffic hazard.

Figure 3.

Size × $18 × class × condition × location = value
(0.7854 (15^2) × ($18) × (80%) × (100%) × (80%) = $2,036

Only a professional tree specialist should evaluate shade trees for insurance companies or courts. The IRS approaches tree appraisal differently. Any casualty loss claim must include proof that the value of the property was reduced by the same amount as that claimed. Using qualified appraisers, principles of shade tree evaluation outlined here may apply to tax losses. Replacement costs are acceptable as proof of property value reduction. To back up tree casualty loss claims, use IRS rulings on similar tree and shrub losses. The attitude of regional reviewing officials toward the legal standing or value of shade trees also may determine the extent of a casualty loss.

The formula for shade tree evaluation cannot determine the value of fruit or nut bearing trees, which can be appropriately determined by crop yield. Neither is it intended for evaluation of palm trees, since palms do not expand in diameter. Fair market value or a dollar value per foot of height growth determines the worth of palm trees.

Cooperative Extension Work in Agriculture and Home Economics, The Texas A&M University System and the United States Department of Agriculture cooperating. Distributed in furtherance of the Acts of Congress of May 8, 1914, as amended, and June 30, 1914.
5M—8-81, Reprint FOR